Increasing Salt Marsh Acreage and Resiliency at Blackwater National Wildlife Refuge

David R. Curson, Erik Meyers, Matthew W. Whitbeck, Albert McCullough, Charles Walker.

Supported by a generous grant from the

National Fish and Wildlife Foundation

Hurricane Sandy Coastal Resiliency Competitive Grants Program

Grant #42942

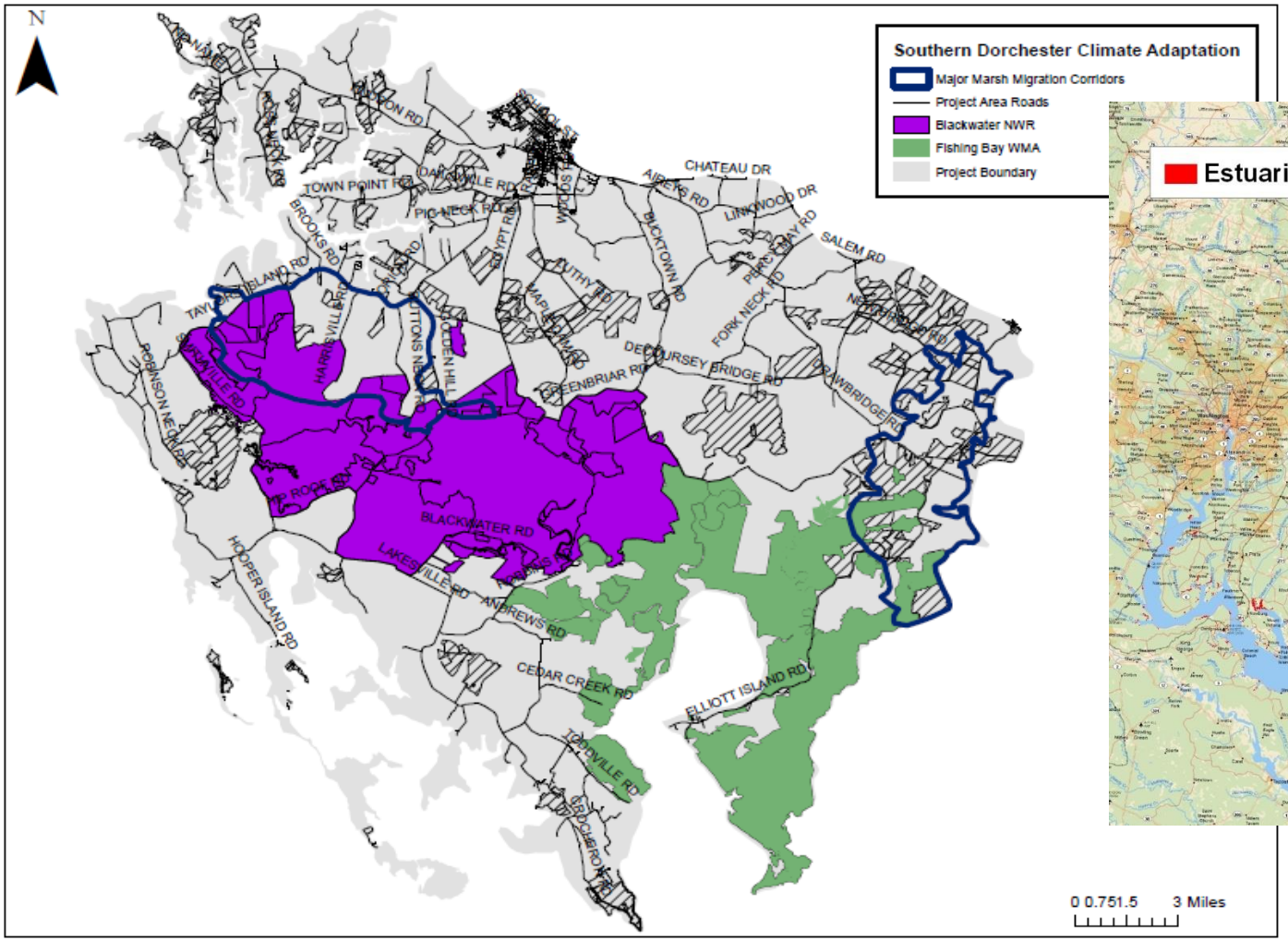
Audubon MARYLAND-DC

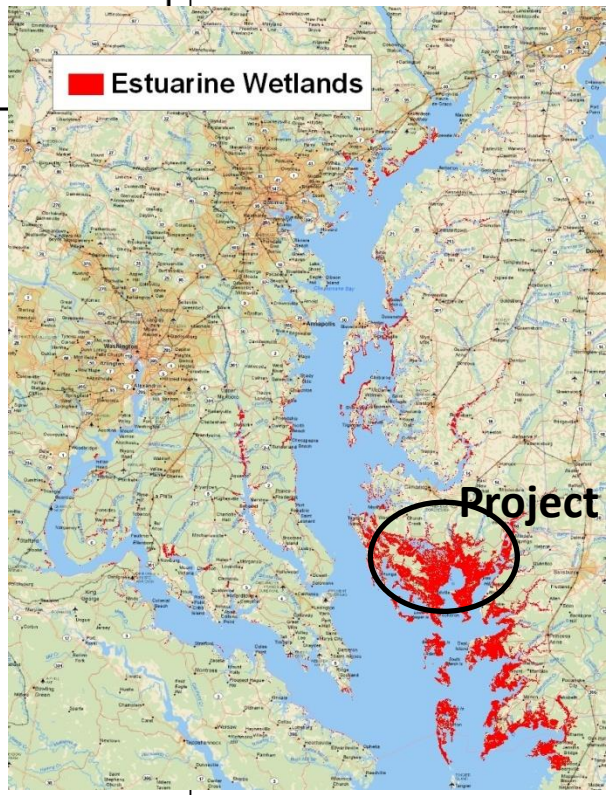
USGS science for a changing world

USDA APHIS

THE CONSERVATION FUND

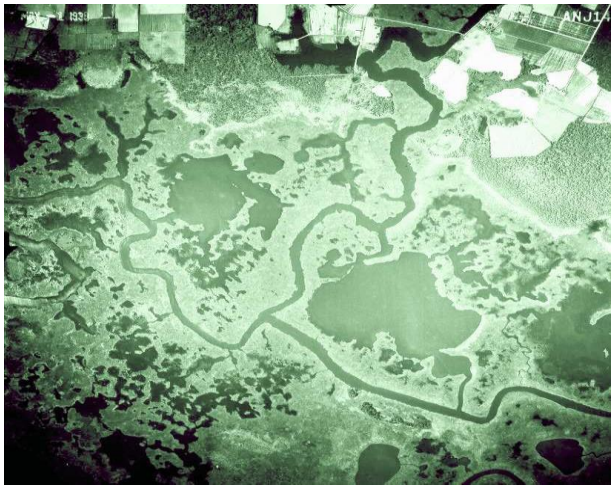
US Army Corps of Engineers


N
Southern Dorchester Climate Adaptation
Major Marsh Migration Corridors
Project Area Roads
Blackwater NWR
Fishing Bay WMA
Project Boundary
CHATEAU DR
AIREYS RD
LINKWOOD DR
SALEM RD
BLACKTOWN RD
FORK NECK RD
DECOURSEY BRIDGE RD
GREENBRIAR RD
BLACKWATER RD
LAKESVILLE RD
ANDREWS RD
CEDAR CREEK RD
ELLIOTT ISLAND RD
HOOPER ISLAND RD
0 0.751.5 3 Miles

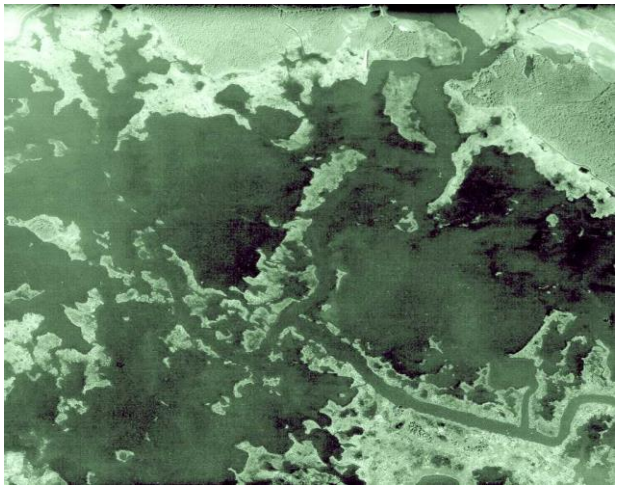

Estuarine Wetlands

Project Are

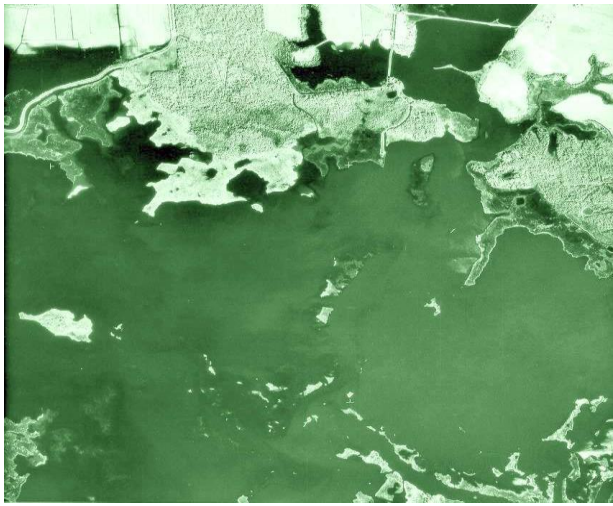
Clear evidence of historic change…



1938



1974



1989

Blackwater Climate Adaptation Project

Audubon MARYLAND-DC

THE CONSERVATION FUND

Strategic Assessment

Objectives

- Identify areas of high marsh habitat of highest priority for salt marsh birds
- Identify and prioritize potential marsh migration corridors
- Identify potential barriers to marsh migration

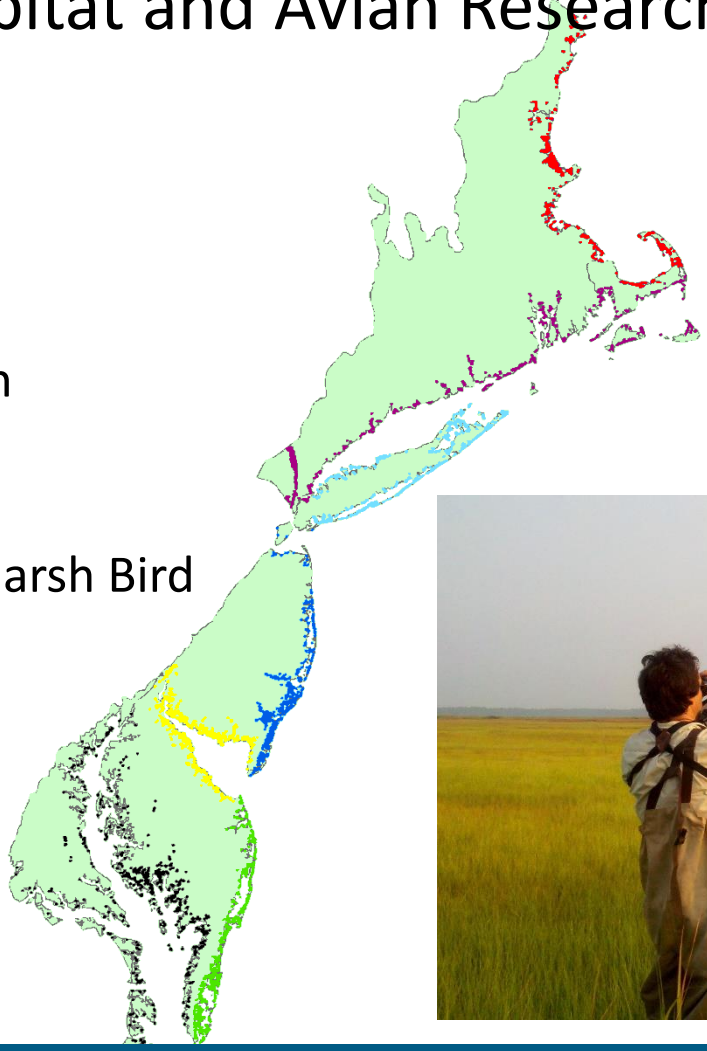
SHARP - Salt marsh Habitat and Avian Research Program

Research partners

- University of Maine
- University of Connecticut
- University of Delaware
- Maryland DNR & Audubon Maryland-DC

Field Methods

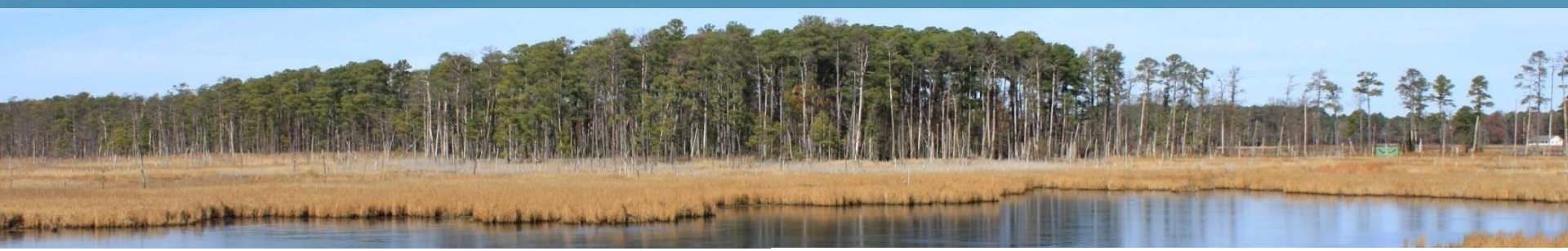
- Standardized N. American Marsh Bird Monitoring Protocol
- Randomly selected points



THE CONSERVATION FUND

U.S. FISH & WILDLIFE SERVICE

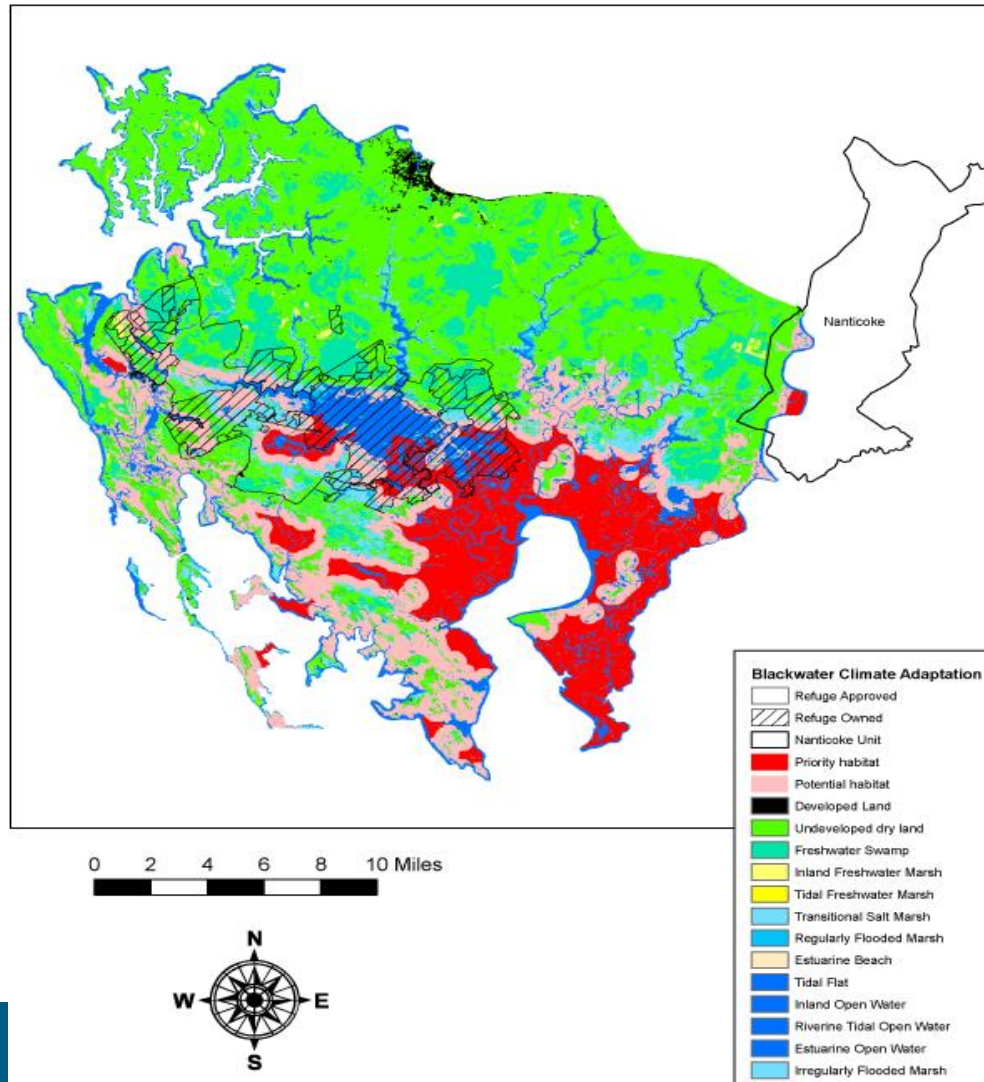
Audubon MARYLAND-DC



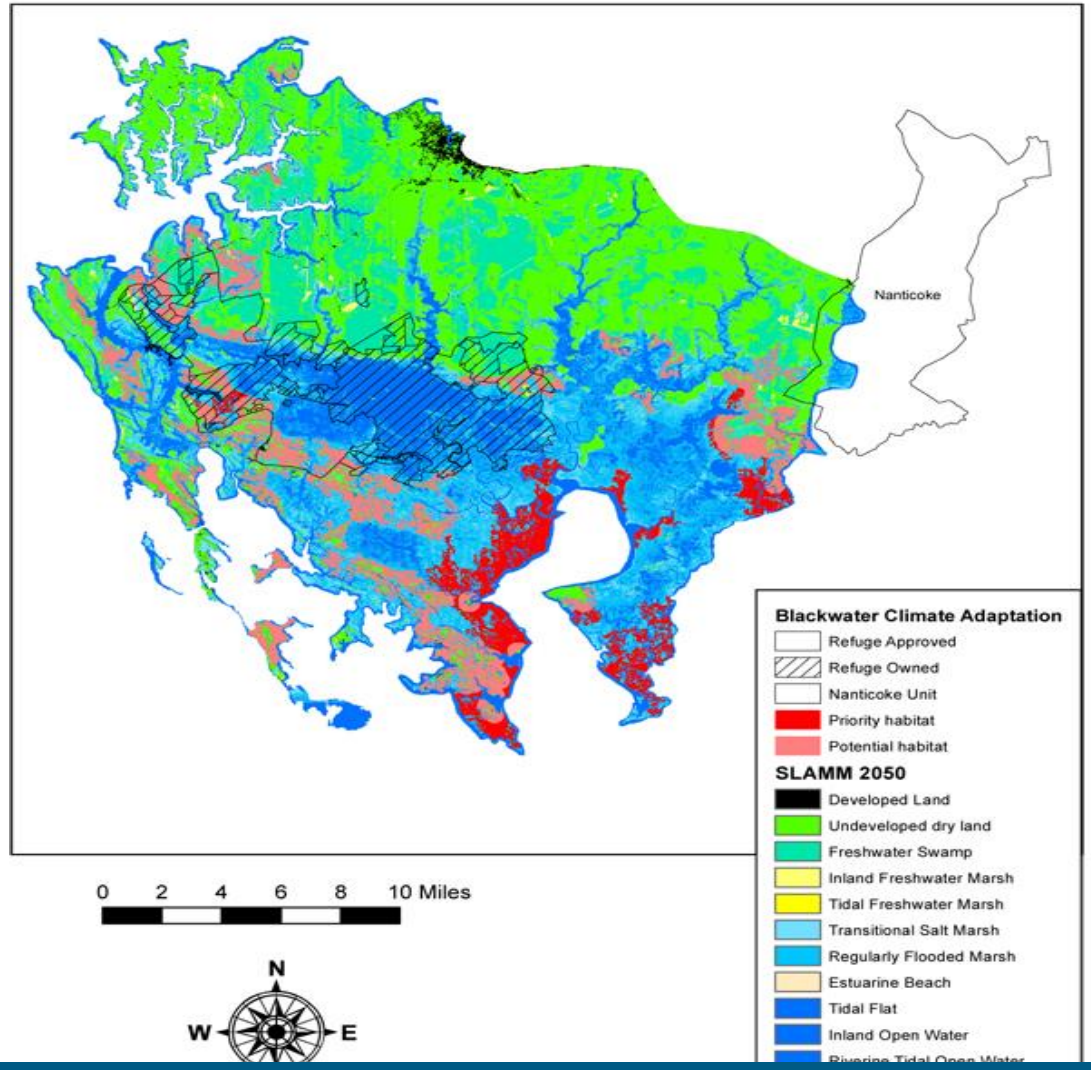
SLAMM –high marsh habitat modeled at 25-year intervals

- Irregularly flooded + transitional marsh
- Minimum patch size = 65 ha
- High priority interior marsh >500 m from upland edge
- Lower priority edge marsh < 500m from upland edge

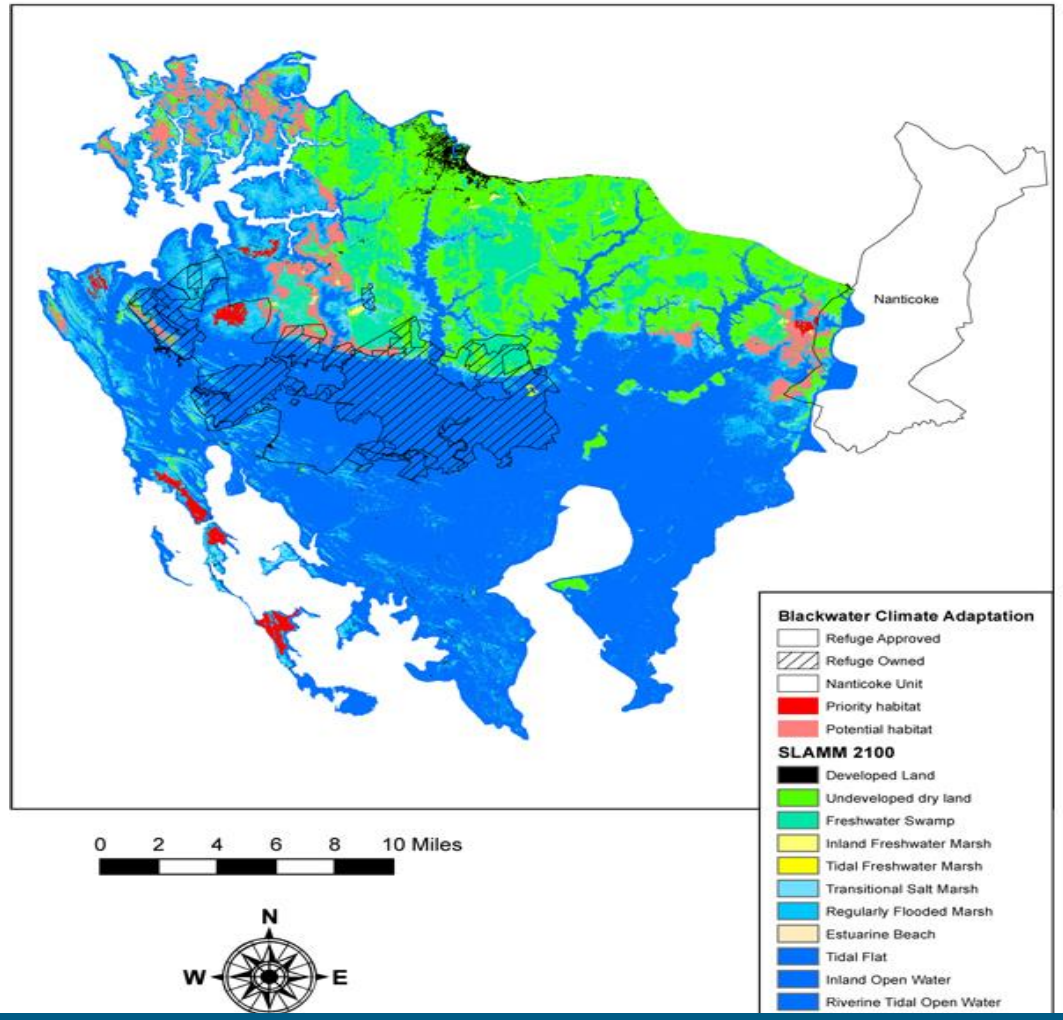
2010 modeled marsh bird habitat (DRAFT)



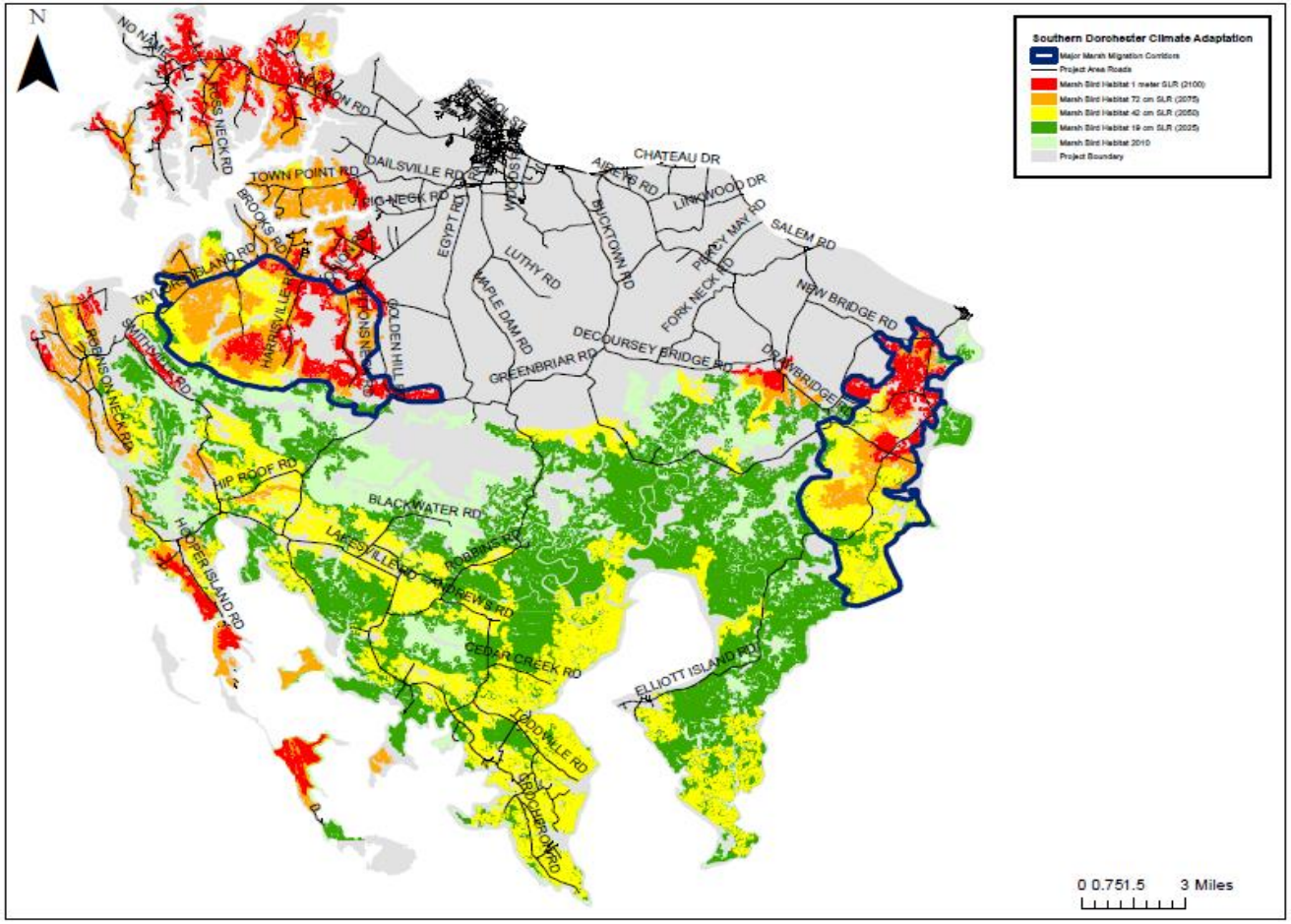
2050 modeled marsh bird habitat (DRAFT)



2100 modeled marsh bird habitat (DRAFT)



Blackwater Salt Marsh Migration Corridors



Adaptation and Resilience Strategies

- *Increase resilience of existing tidal wetlands*
- *Protect priority marsh migration corridors*
- *Facilitate marsh migration*
- Help communities adapt

Audubon MARYLAND-DC
USGS science for a changing world
USDA APHIS
THE CONSERVATION FUND
US Army Corps of Engineers

Managing for Resilience and Persistence

Increase resilience of marshes to sea level rise

>Sediment enhancement.

>Alleviate waterlogging.

>Invasive species control

Facilitate marsh migration

> Removing dead trees (move the edge)

>Moving to salt-tolerant crops (maintain suitable soil cover)

>Invasive species control

Conserve undeveloped lands in marsh migration corridors

THE CONSERVATION FUND

US Army Corps of Engineers

NFWF Hurricane Sandy Coastal Resiliency Grant

Increasing Salt Marsh Acreage and Resiliency for Blackwater National Wildlife Refuge

Audubon MARYLAND-DC

U.S. FISH & WILDLIFE SERVICE

USGS science for a changing world

USDA APHIS

THE CONSERVATION FUND

US Army Corps of Engineers

Principal project elements:

Sediment enhancement (thin-layer) in targeted salt marsh conservation zone

Hydrological improvement design in targeted salt marsh conservation zone

Invasive plant mapping and eradication in key marsh migration corridor

Enhanced invasive species (nutria) eradication efforts across salt marsh ecosystem

Audubon MARYLAND-DC

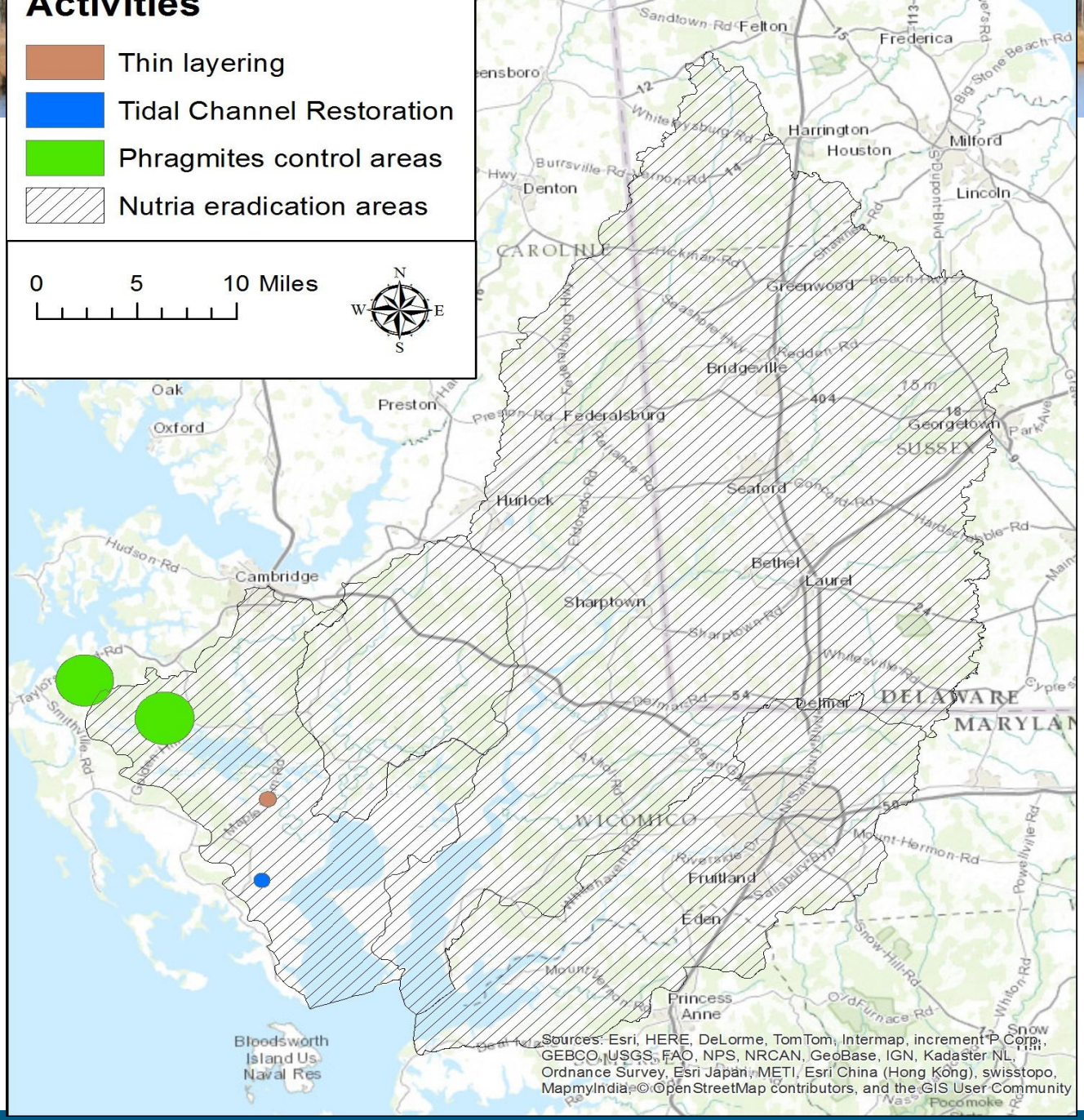
USGS science for a changing world

USDA APHIS

THE CONSERVATION FUND

US Army Corps of Engineers

NFWF Hurricane Sandy Blackwater NWR Resiliency project locations



THE CONSERVATION FUND

Audubon MARYLAND-DC

USGS science for a changing world

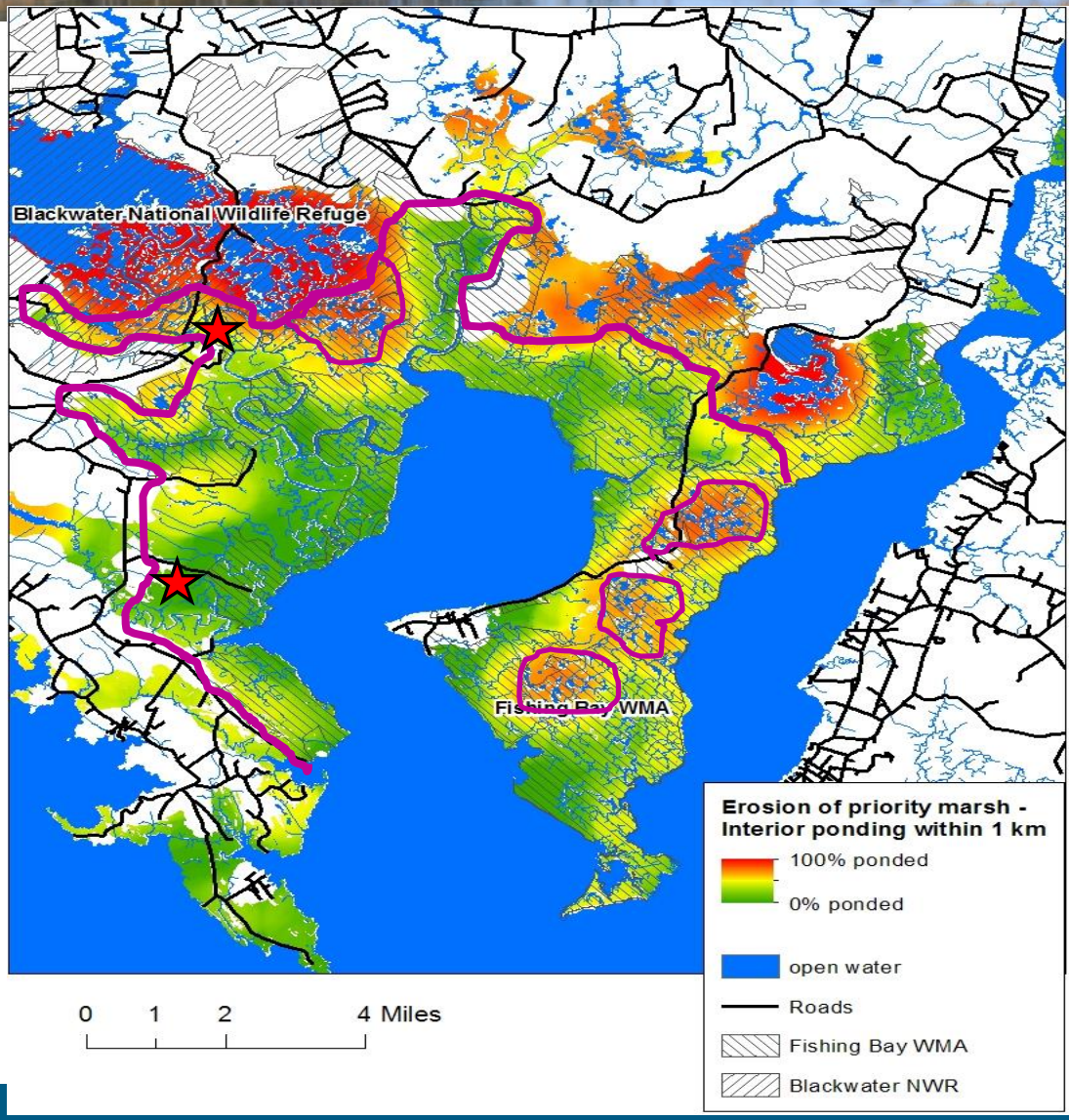
USDA APHIS

US Army Corps of Engineers®

High Priority Adaptation Actions in "Marsh Conservation Zone"

>Thin-layer application

> Improve hydrological exchange



Sediment enhancement (thin-layer elevation) at Shorter's Wharf

- 35-40 acres.
- Currently, threesquare-*Spartina alterniflora*.
- Target condition, *Spartina patens*.
- Upto 57,000 cubic yards sediment from Blackwater River.
- Increase elevation by 4-6 inches.

Audubon MARYLAND-DC
USDA APHIS
THE CONSERVATION FUND
USGS science for a changing world
US Army Corps of Engineers

Shorters Sandy Bird Points

Audubon MARYLAND-DC

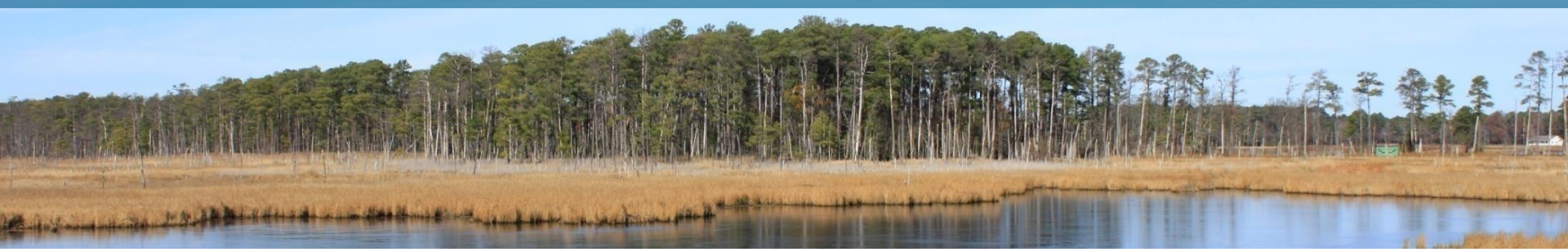
U.S. FISH & WILDLIFE SERVICE

USGS science for a changing world

USDA APHIS

THE CONSERVATION FUND

US Army Corps of Engineers



Hydrologic Improvement at Farm Creek Marsh

USGS science for a changing world

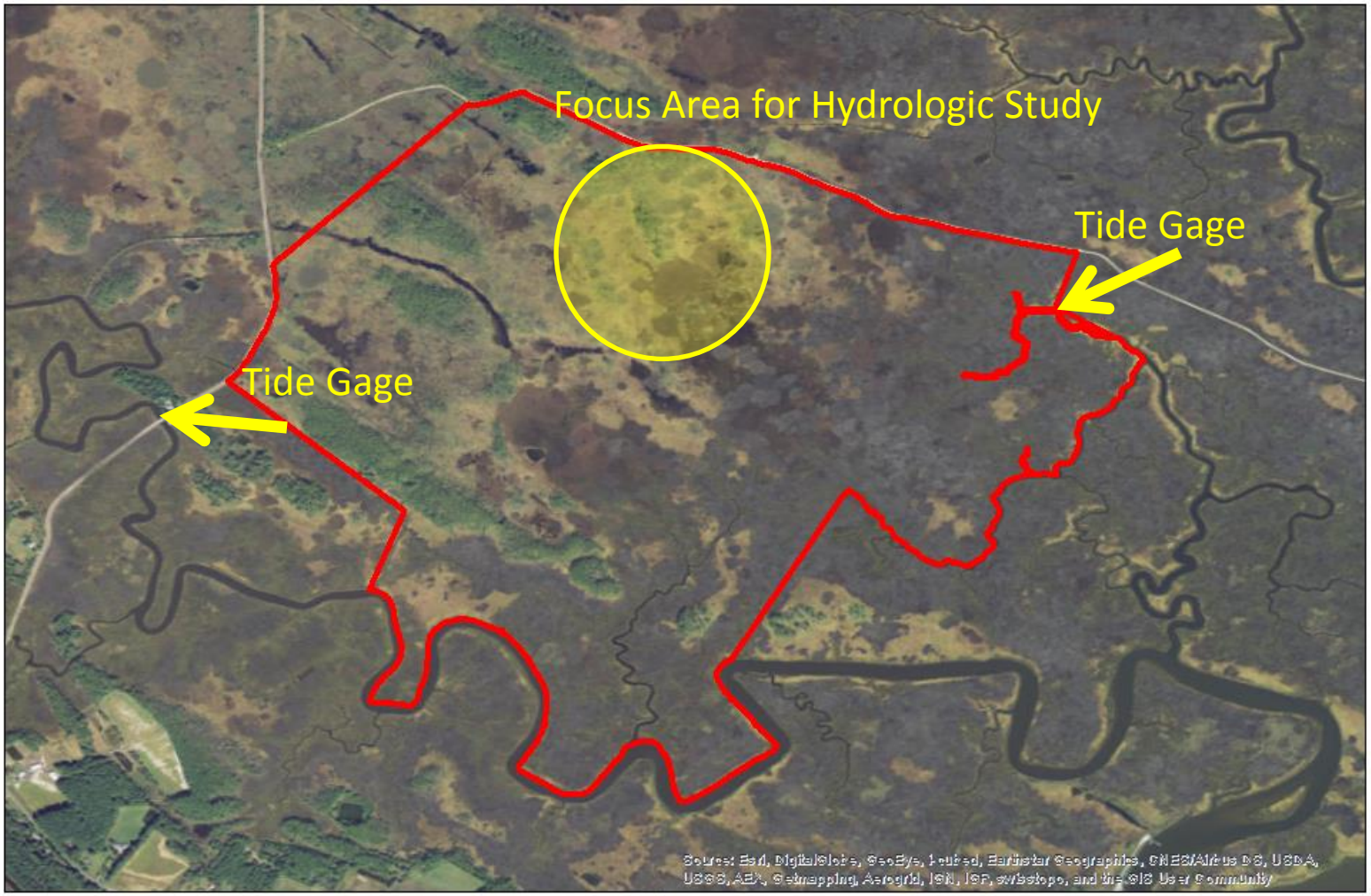
Audubon MARYLAND-DC

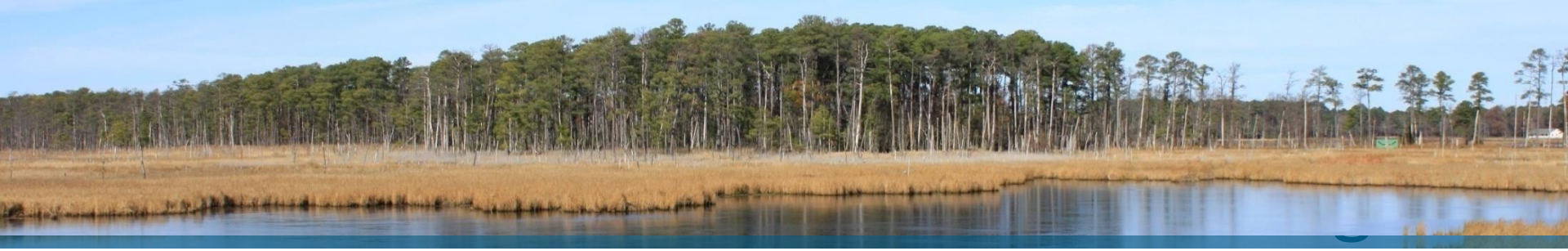
THE CONSERVATION FUND

U.S. FISH & WILDLIFE SERVICE

USDA APHIS

US Army Corps of Engineers


Focus Area for Hydrologic Study
Tide Gage
Tide Gage
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community



USGS Objectives

- Determine the extent and duration of inundation
- Determine the cause of inundation
- Provide data for engineering design

Objective 1: Determine the Extent and Duration of Inundation

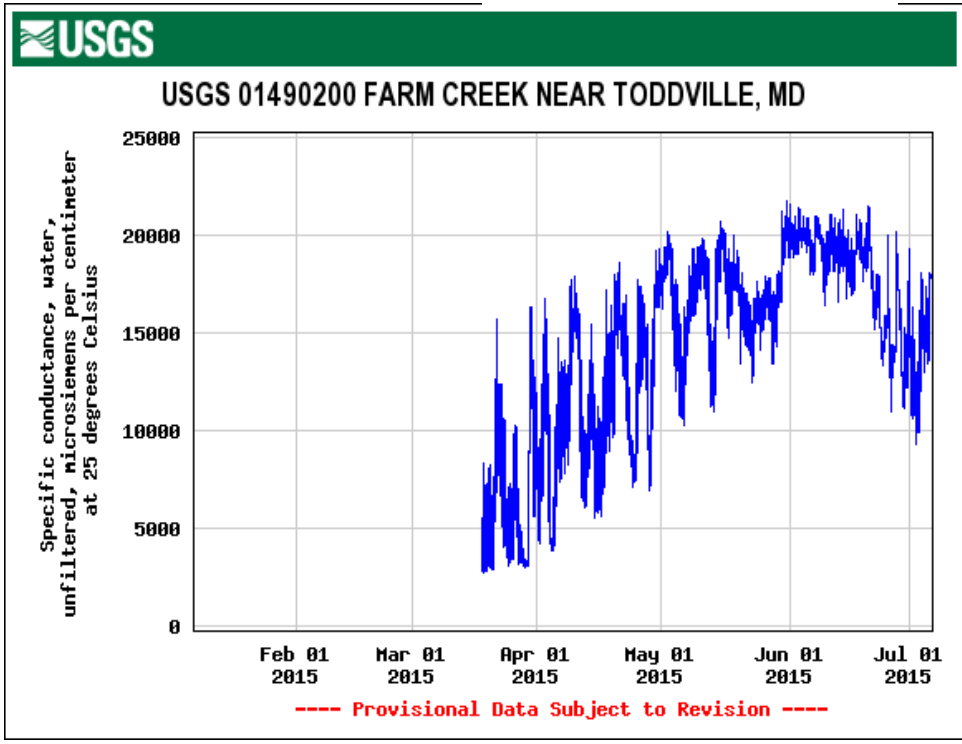
Methods

- Shallow piezometers and surface water monitors
  - Pressure Transducers
- Tide Gage
  - Continuous Real Time
  - Water Quality
  - Rain Gage

Objective 2: Determine the cause of inundation

Methods

- Overlay and compare data:
  - Piezometers
    - Levels
    - Continuous Water Quality
  - Tide Gage
    - Levels
    - Continuous Water Quality
  - Precipitation

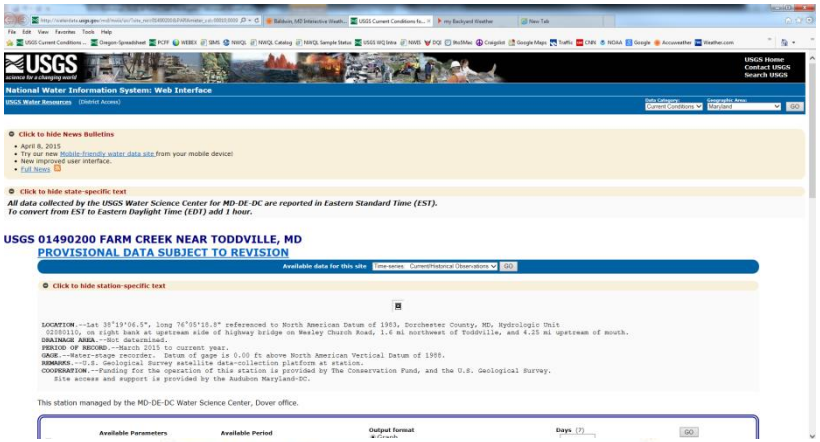


Objective 3: Provide data for engineering design

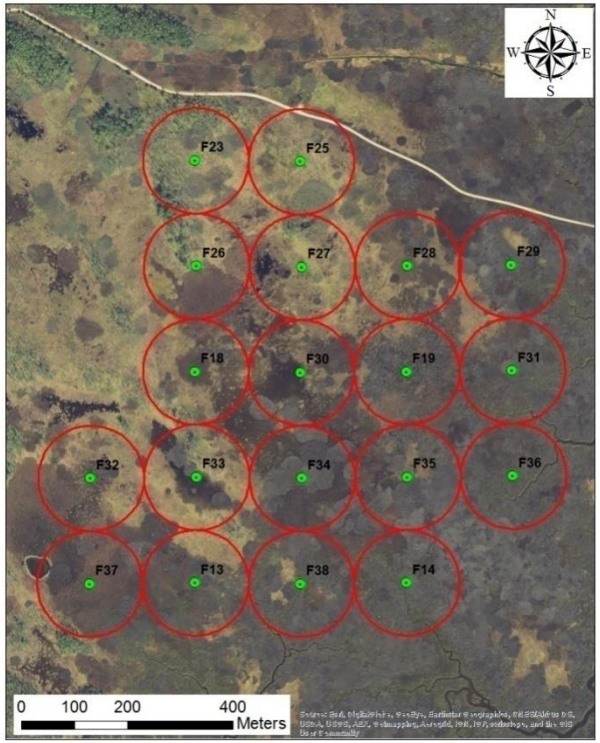
Methods

- Data for the tide gage are available realtime
- Water levels will also be available via NWISweb
- An interpretive report, based on the hydrologic data collected, will be produced

http://waterdata.usgs.gov/md/nwis/uv/?site_no=01490200&PARAmeter_cd=00010,00095,00400,63675,63680,00300,99133,99137,32295,32283,95204



Saltmarsh bird monitoring at Farm Creek Marsh



Farm Creek Sandy Bird Points

Audubon MARYLAND-DC

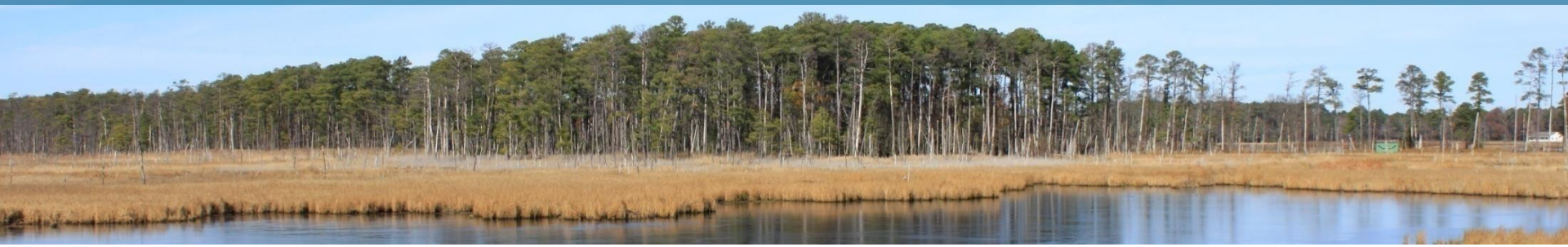
U.S. FISH & WILDLIFE SERVICE

USGS science for a changing world

USDA APHIS

THE CONSERVATION FUND

US Army Corps of Engineers®



Questions?

THE CONSERVATION FUND

U.S. FISH & WILDLIFE SERVICE

Audubon MARYLAND-DC

USGS science for a changing world

USDA APHIS

US Army Corps of Engineers®